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10/006,704	12/10/2001	Shane J. Trapp	M4065.0369/P369-A	3229

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EXAMINER

UMEZ ERONINI, LYNETTE T

ART UNIT

PAPER NUMBER

1765

DATE MAILED: 07/08/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/006,704

Applicant(s)

TRAPP, SHANE J.

Examiner

Lynette T. Umez-Eronini

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 26-35, 71 and 72 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 26-35, 71 and 72 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. Claims 26, 71, and 72 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

In claim 26, "a gaseous mixture consisting essentially of at least one fluorocarbon and ammonia"

In claim 71, "a gaseous mixture consisting of at least one fluorocarbon and ammonia" and

In claim 72, "a gaseous mixture consisting of at least one fluorocarbon and ammonia," raise new matter and lack support by the Specification.

### *Rejections - 35 USC § 102*

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 26-29, 32 and 72 are rejected under 35 U.S.C. 102(b) as being anticipated by Levinstein et al. (US 4,985,353).

Levinstein teaches, "A method of making an integrated circuit structure based on a silicon body . . ." (claim 1) and "other anisotropic reactive ion etchants of silicon dioxide can be used, such as a mixture of  $\text{CHF}_3$  and  $\text{NH}_3$ " (column 6, lines 35-37), which reads on,

A composition suitable for use in etching an insulative layer formed over a substrate in a semiconductor device, said composition comprising:

a gaseous mixture consisting essentially of at least one fluorocarbon and ammonia, **in claim 26**;

a gaseous mixture consisting of at least one fluorocarbon and ammonia, **in claim 72**;

wherein said fluorocarbon is at least one member selected from the group consisting of fluorocarbons, **as in claim 27**;

wherein said fluorocarbon is at least one member selected from the group consisting of  $\text{C}_4\text{F}_8$ ,  $\text{C}_4\text{F}_6$ ,  $\text{C}_5\text{F}_8$ ,  $\text{CF}_4$ ,  $\text{C}_2\text{F}_6$ ,  $\text{CHF}_3$ , and  $\text{CH}_2\text{F}_2$ , **in claim 28**; and

wherein said fluorocarbon is at least one member selected from the group consisting of  $\text{CF}_4$ ,  $\text{CHF}_3$ , and  $\text{CH}_2\text{F}_2$ , **in claim 29**.

Since Levinstein uses the same etchants to etch an insulation layer as that of the claimed invention then, using Levinstein's etchants in the same manner as in the claimed invention would result in said composition that does not remove side wall spacers of a gate stack that is also formed over said substrate, **in claim 32**.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 30 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levinstein (US '373) as applied to claim 26 above, and further in view of Becker et al. (US 6,015,760).

Levinstein differs only in failing to teach wherein said fluorocarbon is at least two members selected from the group consisting of and is a combination of  $\text{CF}_4$ ,  $\text{CHF}_3$  and  $\text{CH}_2\text{F}_2$ , respectively in claims 31 and 32.

Becker teaches anisotropic etching takes place primarily in the vertical direction so that feature widths substantially match the photoresist pattern widths (column 1, lines 40-43); and anisotropic etching is utilized when feature sizing after etching must be maintained within specific limits so as not to violate alignment tolerances or design rules (column 1, line 43-46); and selectively etching  $\text{SiO}_2$  layer with respect to a nitride layer by using a fluorinated chemical etchant system that comprises:  $\text{CF}_4$ ,  $\text{CHF}_3$  and a  $\text{CH}_2\text{F}_2$  additive material (column 4, lines 16-18) and in this way, the etching process provides for the formation of sidewalls in etched layers which have a substantially vertical profile (column 4, lines 29-31).

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of the claim invention to modify Levinstein by

combining the etchants as taught by Becker for the purpose of meeting specific limits that would not violate alignment tolerances or design rules (Becker, column 1, lines 43-46).

6. Claims 33-35 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Levinstein (US '373) as applied to claim 26 above, and further in view of Hamrah (EP 0 553961 A2).

Levinstein differs in failing to specify the flow ratio of said fluorocarbon to said ammonia is not less than about 3:1, in claim 33; within the range of about 3:1 to about 20:1, in claim 34; within the range of about 4:1 to about 10:1, in claim 35; and an operating pressure of from about 30 to about 60 milliTorr, wherein the flow rate ratio of said at least one fluorocarbon to said ammonia is from about 2:1 to about 40:1, in claim 71.

Hamrah teaches the flow rate of 30 sccm  $\text{CHF}_3$  and 7 sccm ammonia (page 9, lines 2-5), which reads on a flow ratio of 30:7 that encompasses the flow rate ratio of said fluorocarbon to said ammonia is not less than about 3:1, **in claim 33**; and said flow rate ratio is within the range of about 3:1 to about 20:1 and 4:1 to about 10:1, respectively **in claims 34 and 35**; and from about 2:1 to about 40:1, **in claim 71**. Hamrah's variable flow ratios, which are shown in Tables on pages 6, 7, and 9, provide evidence that the flow rate ratio is a so-called result effective variable.

It is the examiner's position that it would have been obvious to one having ordinary skill in the art at the time of that claimed invention to modify Levinstein by varying the flow ratio of the etchant composition as taught by Hamrah since it has been

held that discovering an optimum value of a result effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

### **Conclusion**

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lynette T. Umez-Eronini whose telephone number is 703-306-9074. The examiner is normally unavailable on the First Friday.

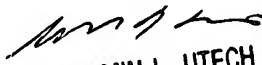
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on 703-308-3836. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-972-9310  
for regular communications and 703-972-9311 for After Final communications.

ltue  
July 2, 2003

  
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SUPERVISORY PATENT EXAMINER  
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